

**WE CLAIM:**

1. Ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus comprising the combination of:

a fist-sized metallic housing having a hollow interior portion, a housing lengthwise axis-disposed first housing wall-traversing male coaxial connection signal port, a housing lengthwise axis-disposed second housing wall-traversing female coaxial connection signal port, a housing radial axis-disposed third housing wall-traversing female coaxial signal port and a housing radial axis-disposed, detented, housing wall-traversing rotatable switch actuation member having accidental switching protection;

a plurality of electrical switch contact structures located within said fist-sized metallic housing hollow interior portion and each received in physical and electrical connection with one of said housing-traversing coaxial connections, said electrical switch contact structures including one cantilevered contact structure movable into elective pressured electrical connection with either of two remainder of said electrical switch contact structures in response to a manually sourced combination of rotational and axial movement of said housing radial axis-disposed housing wall-traversing rotatable switch actuation member;

each of said housing lengthwise axis-disposed first housing wall-traversing male coaxial connection signal port and said housing lengthwise axis-disposed second housing wall-traversing female coaxial connection signal port being coaxially received in recess within a surrounding housing threaded receptacle portion located at opposed lengthwise axis ends of said housing; and

one of said lengthwise axis-disposed surrounding housing threaded receptacle portions being inclusive of externally disposed male threads and one of said lengthwise axis-disposed surrounding housing threaded receptacle portions being inclusive of internally disposed female threads of mating thread compatibility with said externally disposed male threads;

said mating thread compatibility enabling lengthwise axis physical and electrically interconnected stacking of a plurality of said A/B antenna switch apparatus.

2. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 1 wherein said switch apparatus is receivable on an antenna connection port connector of a PRC 117 series military radio transceiver apparatus.

3. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 2 wherein said lengthwise axis-disposed surrounding housing threaded receptacle portion inclusive of externally disposed male threads surrounds a female coaxial connection and said lengthwise axis-disposed surrounding housing threaded receptacle portion inclusive of internally disposed female threads surrounds a male coaxial connection and said threaded receptacle portions and said surrounded coaxial connections

cooperate to enable said lengthwise axis physical and electrically interconnected stacking of a plurality of said A/B antenna switch apparatus.

4. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said male and said female coaxial connections are bulkhead mountable commercial BNC connectors.

5. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 4 further including a plurality of flexible coaxial cable tether members having interconnection compatibility with said commercial BNC connectors in said A/B antenna switch apparatus threaded receptacle portions and selectably interconnecting said radio transceiver with said A/B antenna switch apparatus and with remotely located antenna members.

6. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said a fist-sized metallic housing is comprised of one of cast aluminum and machined aluminum materials and includes a plurality of o-ring seals disposed adjacent housing apertures.

7. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said rotatable switch actuation member includes a metal body portion having a detent receptacle portion and an electrically insulated tip portion engageable with said movable cantilevered contact member.

8. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 7 wherein said rotatable switch actuation member includes a thumb-recessed rotation-control knob and wherein said rotatable switch actuation member accidental switching protection includes a housing protrusion member disposed in interfering cooperation with said thumb-recessed rotation-control knob.

9. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said plurality of electrical switch contact structures located within said fist-sized metallic housing hollow interior portion each include a noble metal electrical contact element.

10. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein each of said housing wall-traversing male coaxial connection signal port, said housing lengthwise axis-disposed second housing wall-traversing female coaxial connection signal port, said housing radial axis-disposed third housing wall-traversing female coaxial signal port and said housing radial axis-disposed, detented, housing wall-traversing rotatable switch actuation member includes an o-ring member disposed in a housing opening-sealing relationship.

11. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said apparatus includes a removable end closure

portion receivable in hollow interior portion-closing, o-ring-sealed relationship with an endwise aperture of said housing hollow interior portion and including said lengthwise axis-disposed threaded receptacle portion male threads and female coaxial connection received thereon.

12. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 3 wherein said cantilevered contact structure located within said fist-sized metallic housing hollow interior portion is connected with said first housing wall-traversing male coaxial connection signal port and is movable into elective pressured electrical connection with either of two fixed position remainder of said electrical switch contact structures connected with said a female coaxial connection.

13. The ruggedized, manually operated, physically stackable, radio set mountable, A/B antenna switch apparatus of claim 1 wherein said switch apparatus is receivable on an antenna connection port connector of a PCS 5 series military radio transceiver apparatus.

14. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an N plurality of differently-configured antenna members, said method comprising the steps of:

communicating transmitting and received radio frequency energy with each said antenna member of said N plurality of differently configured antenna members via one of an N plurality of antenna-connected coaxial transmission line members;

selectably connecting each of said N plurality of coaxial transmission line members with said portable radio transceiver apparatus unitary input/output port by way of manually operated two-position electrical switch elements disposed externally of said portable radio transceiver apparatus and adjacent said unitary input/output port thereof;

said selectably connecting step including stacking an  $N - 1$  interconnected plurality of said manually operated two-position electrical switch elements externally of said portable radio transceiver apparatus, in connection with said unitary input/output port thereof, whenever N has a magnitude in excess of two and disposing one of said manually operated two-position electrical switch elements externally of said portable radio transceiver apparatus when N has a magnitude of two;

electing a subsequent in said stacking two-position electrical switch element radio frequency energy feed-through position setting for each said two-position electrical switch element located intermediate said portable radio transceiver apparatus and an active antenna coaxial transmission line member in said stacked plurality of two-position electrical switch elements; and

selecting a new pattern of two-position electrical switch element settings in response to each change of portable radio transceiver apparatus operating mode requiring a differently configured antenna member;

said stacking of  $N - 1$  interconnected plurality of manually operated two-position electrical switch elements together with said selecting step enabling rapidly changed antenna operation of said wide band portable radio transceiver apparatus absent coaxial transmission line member uncoupling and reconnection steps under said battlefield conditions and in darkness.

15. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an  $N$  plurality of differently-configured antenna members of claim 14 wherein said step of stacking an  $N-1$  interconnected plurality of said manually operated two-position electrical switch elements externally of said portable radio transceiver apparatus includes interconnecting a plurality of said manually operated two-position electrical switch elements by way of mating coaxial cable fittings held in mated condition by surrounding thread-engaged male and female threaded members.

16. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an  $N$  plurality of differently-configured antenna members of claim 14 wherein said differently-configured antenna members comprise antenna members having at least one of a differing physical configuration, a differing electrical resonance frequency, a differing azimuth orientation, a differing elevation orientation, a differing gain characteristic, a differing terrain location and a differing electrical field strength pattern.

17. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an  $N$  plurality of differently-configured antenna members of claim 14 wherein said differently-configured antenna members include a satellite communication-capable directive antenna and a monopole omni directional antenna.

18. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an  $N$  plurality of differently-configured antenna members of claim 14 further including the step of mounting at least one of said two-position electrical switch elements disposed externally of said portable radio transceiver apparatus and adjacent said unitary input/output port thereof directly onto an antenna connector port of said military transceiver apparatus.

19. The battlefield conditions-adapted method of electively connecting a unitary input/output port of a wide-band portable radio transceiver apparatus with any of an  $N$  plurality of differently-configured antenna members of claim 14 wherein said step of electing a subsequent in said stacking two-position electrical switch element radio frequency energy feed-through position setting for each said two-position electrical switch element located intermediate said portable radio transceiver apparatus and an active antenna coaxial

transmission line member in said stacked plurality of two-position electrical switch elements comprises selecting an axially straight through radio frequency energy coupling path in at least one of said stacked two-position electrical switch elements.

20. Military transceiver communications apparatus comprising the combination of:

a transceiver military radio-set;

an abuse immune, protective clothing compatible, physically stackable A/B antenna switch apparatus disposable on said transceiver military radio-set and comprising:

a table salt shaker-sized anodized aluminum switch housing having a hollow interior portion, a housing lengthwise axis-disposed first housing wall-traversing male fifty ohm characteristic impedance coaxial connection signal port, a housing lengthwise axis-disposed second housing wall-traversing female fifty ohm characteristic impedance coaxial connection signal port, a housing radial axis-disposed third housing wall-traversing female fifty ohm characteristic impedance coaxial signal port and a housing radial axis-disposed, housing wall-traversing, axially movable rotatable and detented metallic switch actuation member having an electrical insulating interior tip portion and a recessed and position-identifying-groove marked housing-external head portion additionally cooperating with an accidental switching prevention physical interference protrusion element disposed on said housing adjacent said switch actuation member housing wall traversing location;

a trio of electrical switch contact structures located within said table salt shaker-sized anodized aluminum housing hollow interior portion and each received in physical and electrical connection with one of said housing-traversing fifty ohm coaxial connections, said electrical switch contact structures including one cantilever spring-biased contact structure disposable into elective pressured electrical connection with either of two fixed-position remaining of said electrical switch contact structures in response to a manually sourced combination of rotational and axial movement of said housing radial axis-disposed housing wall-traversing rotatable and detented switch actuation member and cantilever spring-biased contact structure urging by said housing wall-traversing rotatable and detented switch actuation member electrical insulating interior tip portion;

each of said housing lengthwise axis-disposed first housing wall-traversing male fifty ohm characteristic impedance coaxial connection signal port and said housing lengthwise axis-disposed second housing wall-traversing female fifty ohm characteristic impedance coaxial connection signal port being coaxially received in recess within a surrounding housing  $\frac{3}{4}$ -16 threaded receptacle portion located at opposed lengthwise axis ends of said housing; and

one of said lengthwise axis-disposed surrounding housing  $\frac{3}{4}$ -16 threaded receptacle portions being inclusive of externally disposed male threads and one of said lengthwise axis-disposed surrounding housing threaded receptacle portions being inclusive of internally disposed female threads of mating  $\frac{3}{4}$ -16 thread compatibility with said externally disposed

male threads and with male 3/4-16 threads of an output connector of said transceiver military radio-set;

said mating thread compatibility enabling lengthwise axis physical and electrically interconnected stacking of a plurality of said abuse-immune, manually operated, physically stackable, transceiver military radio-set mountable, A/B antenna switch apparatus devices and manual selection in each said stacked A/B antenna switch, during darkness and battlefield conditions, of one of radio frequency energy feed through and radio frequency energy exchange with a selected one of a plurality of radio frequency antennas coupled by coaxial cables and said stack of said A/B antenna switches to said transceiver radio-set.

21. The military transceiver communications apparatus of claim 20 wherein said transceiver radio-set consists of one of a PRC 117F high frequency to ultra high frequency military transceiver radio set.

22. The military transceiver communications apparatus of claim 20 wherein said abuse immune, protective clothing compatible, physically stackable A/B antenna switch apparatus housing radial axis-disposed, housing wall-traversing, axially movable rotatable and detented metallic switch actuation member having an electrical insulating interior tip portion and a recessed and position-identifying-groove marked housing-external head portion includes a thumb recessed dimple head portion capable of manipulation by one of a weather protected and a chemical warfare agent protected gloved human hand.

23. Military special operations forces portable voice communications apparatus comprising the combination of:

a portable battery operated special operations forces radio frequency-tunable high frequency and ultra high frequency voice communications radio transceiver having a single antenna electrical energy communications port coaxial fitting;

a monopole first radio antenna member having a substantially uniform circular electromagnetic field pattern, local geographic area ground to ground and ground to air communications capability and a coaxial electrical energy communication port;

a multi-element plus back plane reflector second radio antenna member having a major lobe unidirectional electromagnetic field pattern, ground to orbiting satellite communications capability and a coaxial cable electrical energy communicating second tether member; and

a manually operable, environmentally sealed, metal housing enclosed, coaxial single pole double throw electrical switch member physically receivable on said radio transceiver single antenna electrical energy communications port coaxial fitting and having a special operations forces personnel gloved hand compatible, detented, push pull switch position-changing manual input, said electrical switch member having first and second electrical energy

communicating coaxial ports connectable with said first radio antenna member and said second radio antenna member respectively;

said electrical switch connection with said first radio antenna member being by way of a selectable one of a direct engagement between said first antenna member coaxial electrical energy communication port with said electrical switch first electrical energy communicating port and a coaxial cable electrical energy communication first tether member coupling of said first antenna member coaxial electrical energy communication port with said electrical switch first electrical energy communicating port;

said electrical switch connection with said second radio antenna member being by way of said coaxial cable electrical energy communication second tether member coupling of said second antenna member coaxial electrical energy communication port with said electrical switch second electrical energy communicating port; and

said manually operable, environmentally sealed, metal housing enclosed, coaxial single pole double throw electrical switch member enabling rapid, minimal transceiver communications interrupted, first antenna and second antenna transition-inclusive communications between said special operations forces personnel and both local and orbiting satellite-accessed distant personnel.

24. The military special operations forces portable voice communications apparatus of claim 23 further including a third coaxial cable tether member connected between said radio transceiver single antenna electrical energy communications port coaxial fitting and an electrical switch member coaxial port common between said first and second electrical energy communicating coaxial ports.